Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	WP Docket No. 15-32
Creation of Interstitial 12.5 kHz Channels in the	)	RM-11572
800 MHz Band between	)	
809-817/854-862 MHz	)	

To: The Commission

COMMENTS OF MOBILE RELAY ASSOCIATES ON LAND MOBILE COMMUNICATIONS COUNCIL PROPOSED 800 MHZ INTERSTITIAL CHANNEL INTERFERENCE CONTOURS

Mobile Relay Associates ("MRA"), by its attorney and pursuant to Public Notice, *Wireless Telecommunications Bureau and Public Safety and Homeland Security Bureau Seek Comment on Land Mobile Communications Council's Proposed 800 MHz Interstitial Channel Interference Contours*, DA 15-844, released July 24, 2015, hereby submits its Comments regarding the 800 MHz interstitial channel interference contour proposal submitted by the Land Mobile Communications Council ("LMCC"). These Comments are timely filed. *See* Public Notice, *Public Safety and Homeland Security Bureau and Wireless Telecommunications Bureau Announce Comment Date for Land Mobile Communications Council's Proposed 800 MHz Interstitial Channel Interference Contours*, DA 15-892, released August 7, 2015.

MRA supports the major portion of the LMCC proposal, and applauds LMCC for its diligent efforts in this arena. However, one portion of the LMCC proposal is inconsistent with both the rest of the LMCC proposal, and with over thirty years of public policy. That one portion of the LMCC proposal is its proposed treatment of instances where there is absolutely no spectral overlap between the incumbent station and the proposed station. Neither the Commission nor the LMCC has ever required an interference analysis when there is a complete absence of spectral

overlap, and, as to very narrowband 4 kHz emissions in particular, there is a plethora of real-world experience proving that interference to incumbent stations does not exist in the absence of spectral overlap.

Background of MRA and Its Interest in This Proceeding

MRA is one of the longest-established and largest privately-held fleet/dispatch operators in the United States, serving tens of thousands of mobile/portable fleet units across the country. MRA was founded in 1979, and its principals collectively have over one hundred years of experience in the land mobile industry. MRA is one of only a few fleet/dispatch operators to have in-house engineering expertise and resources; among other things, MRA is one of the few such operators to have its own in-house capability for preparing TSB-88 interference analyses and for engineering design. Indeed, MRA provides engineering design, consulting and system management services to other fleet/dispatch operators in multiple markets.

MRA holds a number of Part 90 authorizations in various spectrum bands, including VHF and 450-512 MHz, as well as 800 MHz. These licenses are an integral part of MRA's spectrum portfolio and its day-to-day operations, used by a variety of MRA customers, including local governments, school bus fleets, local delivery fleets, ambulance companies and others to deliver important public and private services. In addition, many MRA customers hold their own authorizations, including 800 MHz authorizations.

Over the past several years, MRA has been a leader in implementing and operating complex and extended Part 90 radio systems using very narrowband (4 kHz emission) channels in the 450-512 MHz band, a spectrum band with propagation characteristics similar to the 800 MHz band, and with equipment having similar characteristics to the equipment deployed in the 800 MHz band. MRA serves thousands and thousands of 4-kHz mobile and portable units across

southern California, operating in close spectral proximity (but without any spectral overlap) to unaffiliated Part 90 licensees, including many Public Safety licensees. (Indeed, a number of MRA's 4 kHz customers are Public Safety entities.) Significantly, there has been virtually no interference (much less "harmful" interference) between adjacent channel operations, *so long as there is no spectral overlap between the occupied bandwidths of the adjacent channels.*

Much of MRA's business is conducted in the largest and most spectrum-congested areas of this country, such as the Los Angeles metropolitan area, and there is simply not enough spectrum to meet demand. Therefore, MRA has a significant interest in promoting the efficient use of this spectrum, and would be greatly affected by the outcome of this proceeding.

Distinguishing "Co-Channel" from "Adjacent Channel" Situations

Before engaging in a technical discussion, it is necessary to define certain terms. That is particularly true where, as here, the discussion involves different systems with different channel bandwidths. Consistent with the treatment by the Commission and the LMCC of spectrum in the 450-512 MHz band, MRA defines the bandwidth of any particular channel by its *occupied* bandwidth, as represented by its emission designator. Thus, even if an incumbent 800 MHz license is for "25 kHz" channels, if the emission designator on that license is for 20 kHz emissions, then the occupied bandwidth of each channel extends 10 kHz on each side of the channel's centerpoint. Conversely, if a channel is licensed for 11 kHz emissions, then the occupied bandwidth of that channel extends 5.5 kHz on each side of the channel's centerpoint.

Two channels are "co-channel" whenever they are spectrally-overlapping, even if they have different centerpoints. Thus, for example, where licensee X is licensed for 855.0375 MHz with a 20 kHz emission designator, it occupies the spectrum between 855.0275 MHz and 855.0475 MHz. Where licensee Y is licensed on an interstitial channel centered 12.5 kHz

removed (*i.e.*, 855.0500 MHz), but has an 11 kHz emission designator, licensee Y occupies the spectrum between 855.0445 MHz and 855.0555 MHz, and is *co-channel* with licensee X, because they each occupy the same spectrum between 855.0445 MHz and 855.0475 MHz.

For purposes of these Comments, two channels are "adjacent channel" if, and only if, they do not have any spectral overlap whatsoever.

DISCUSSION

I. Licensees Should Be Protected Only Against Co-Channel Interference

In establishing its separation requirements under Part 90, the Commission has consistently adhered to one bedrock philosophy – interference analyses are geared to protect only against co-channel interference, not adjacent channel interference. That is, and always has been, true no matter what Part 90 spectrum band was involved. The actual analysis methodology for determining the presence or absence of co-channel interference might change depending on the service or the spectrum propagation characteristics, but the analysis has always been focused solely upon co-channel interference.[1]

There is a solid reason for the Commission and frequency coordinators to have followed this philosophy for over thirty years now – if the Commission afforded protection to adjacent channel operators when issuing licenses, huge amounts of spectrum would lie fallow for no good reason, and congestion would be even more intolerable than it is. Such a result undermines the

---

[1] *See, e.g.,* former Section 90.621(b) from the 1987 Code of Federal Regulations, which read in pertinent part: "Only co-channel interference between base station operations will be taken into consideration [when assigning frequencies]. *Adjacent channel and other types of interference will not be taken into account*." (Emphasis added.)

To repeat, even though sometimes TSB-88 is referred to as being an analysis of "adjacent channel" interference, in fact TSB-88 comes into play *only* when there is some amount of spectral overlap between two channels with different centerpoints, *i.e.*, only when the two channels are "co-channel" at least in part.

Commission's public policy favoring, even mandating, efficient utilization of spectrum.[2] This philosophy has proven time and again to be consistent with the public interest. There is no reason to discard it today.

Indeed, given the superior performance of today's digital equipment at rejecting transmissions on other spectrum, there is even less reason today to worry about adjacent channel interference than there was in the 1980s.[3] MRA's recent experience with non-spectrally-overlapping 4 kHz channels in close proximity, detailed above, is further proof that "protecting" against the transmissions of non-spectrally-overlapping licensees is an incredibly inefficient use of the spectrum.

II. The LMCC Proposal Improperly Mandates Leaving Available Spectrum Fallow

A. LMCC Requires Frequency Coordination Even for Adjacent Channels

With regard to the licensing of new very narrowband 4 kHz operations on offset channel centerpoints in the 800 MHz band, the LMCC proposal fails to strike the appropriate balance between protection of incumbent operations and enabling efficient re-use of spectrum. Specifically, the LMCC proposes to protect adjacent channel (*i.e.*, non-spectrally-overlapping) licensees from "harmful interference".

---

[2] Indeed, improving spectrum efficiency was the primary rationale for mandating narrowbanding in the spectrum bands below 512 MHz. *See, e.g., Implementation of Sections 309(j) and 337 of the Communications Act of 1934 as Amended; Promotion of Spectrum Efficient Technologies on Certain Part 90 Frequencies*, Second Report and Order and Second Further Notice of Proposed Rulemaking, 18 FCC Rcd 3034 (2003) (*seriatim*).

[3] Even the older, analog wideband 800 MHz equipment which is still in use in some areas is fully capable of rejecting spurious emissions from adjacent channels. Moreover, most 800 MHz equipment in service today (and certainly almost all equipment to be deployed in the future) is digital equipment with even better capability to reject spurious emissions. As compared with some of the older equipment used in the 450-512 MHz band, 800 MHz equipment is better equipped to reject spurious emissions. Yet even that older 450-512 MHz equipment has consistently operated without a problem in proximity to constant narrow-band transmissions, so long as there was no spectral overlap.

Such a departure makes no sense from any technological standpoint. Such a departure will cause an enormous amount of 800 MHz spectrum to lie fallow at the same time that congestion is playing havoc in major metro areas and inhibiting growth, without reducing real-world harmful interference one iota.

The LMCC proposed tables should be modified to show as "NR" ("no analysis required") for those table-cells where there is no spectral overlap between the incumbent licensee and the proposed licensee. The problem exists primarily in the column in each table "NxDN 4.8", the column referring to 4 kHz emission designator proposals. Any new interstitial proposal is by definition centered 12.5 kHz away from incumbent licensee channel centers. Any interstitial 4 kHz emission designator will *not* overlap spectrally with (*i.e.*, not be co-channel to) any incumbent 800 MHz channel, except in the one case of TETRA equipment utilizing a 22 kHz emission (and even then, the spectral overlap is only ½ kHz).

B. Alternative Proposal for 4 kHz Interstitial Channels

MRA proposes to modify the column labeled "NxDN 4.8" in each of the two LMCC tables as follows. For that column, all rows except the TETRA row will read "NR". For the table "Interstitial to 25 kHz Interference Contour", the TETRA row will require an interstitial derated interference contour of 60, rather than the "45" contained in the current table. For the table "25 kHz to Interstitial Interference Contour", the TETRA row will require a 25 kHz derated interference contour of 40, rather than the "30" contained in the current table. MRA's proposed revised tables are attached hereto.

MRA's proposed changes herein will enable the licensing of many more new interstitial licensees without causing increased interference to any incumbent licensee, resulting in a much

more efficient use of spectrum. As so modified, the LMCC tables would be consistent with the public interest, and if so modified, MRA could support their adoption.

As previously noted, MRA bases its position on the last five years of operations, with many thousands of heavy users, in the heavily congested spectrum environment of southern California, where incumbent Public Safety systems have not suffered any harmful interference from non-spectrally-overlapping 4 kHz-wide operations. If there were a problem with such operations, it have been revealed by now.

III. Additional Funds for Field Office Enforcement Are Required

MRA has one further caveat – *interstitial 800 MHz licensing can only work in the real world if this Commission enforces its rules against unlicensed and unlawful emissions*.

Under the LMCC proposal, the separation required between an incumbent station and a proposed station will vary, based upon both the channel width/emission type of the incumbent station, and the channel width/emission type of the proposed station. Thus, for example, a proposal for a new 12.5 kHz-wide channel with an 11K3F3E emission designator will have an interference contour vis-à-vis an incumbent 25 kHz-wide analog of 25 dBu. If there is no overlap between that 25 dBu contour and the reliable service contour of the incumbent station, the new proposal will be granted.

However, if, upon grant, the new licensee transmits in the real world with a 20 kHz emission instead of 11K3F3E as licensed, the new station will interfere with the incumbent. In such a case, there must be an adequate supply of Commission inspectors, armed with appropriate testing and monitoring equipment. And those inspectors must promptly inspect and shut down the offender. In the absence of adequate Commission enforcement, 800 MHz interstitial licensing could devolve into a hornet's nest of interference, as unscrupulous operators file FCC

applications proposing a non-interfering emission designator in order to have their application granted, but then construct at variance with what they said in their application.

CONCLUSION

MRA applauds the LMCC for its diligent efforts to craft a suitable regime for the licensing of interstitial channels in the 800 MHz band. For the most part, the LMCC proposal is consistent with the public interest and worthy of implementation. However, insofar as the LMCC proposal purports to require frequency coordinators to conduct interference analyses in cases where there is absolutely no spectral overlap between the incumbent licensee and the proposed licensee, the LMCC proposal is flaws and must be modified. MRA has presented herein its proposed modification to the LMCC proposal.

This Commission should balance the need to protect incumbent operations from harmful interference, on the one hand, against the need ensure efficient use of spectrum, on the other. The Commission has traditionally accomplished that balance by implementing rules to prevent co-channel interference, but relying upon spectral separation and equipment filtering to protect against adjacent channel interference. That methodology has worked exceedingly well for at least thirty years, and there is no reason to depart from it now.

To the extent that the LMCC proposed 800 MHz interstitial interference criteria require that non-spectrally-overlapping spectrum remain fallow, just so that incumbents can have "buffer" spectrum, that proposal countermands a generation of Commission policy, and wastes a valuable spectrum resource. Moreover, it wastes a valuable resource for no good reason, because such a fallow "buffer" is completely unnecessary to protect incumbent operations from interference. Accordingly, the LMCC proposed tables should be modified to eliminate the need for any contour analysis except in the case of spectral overlap.

In any event, implementation of a regime to license interstitial channels at 800 MHz will present a challenge to the Commission's enforcement personnel, since they would have to inspect stations with respect to their emission types. Such inspections will require more personnel, and appropriate testing and monitoring equipment. The Commission should stop treating its District Offices as unwanted step-children, and begin providing those District Offices with adequate tools to enforce Commission rules (including any rule adopted herein) and maintain a level playing field among competitors.

Respectfully submitted,
MOBILE RELAY ASSOCIATES

September 8, 2015

By: _____/s/_____
David J. Kaufman, Its Attorney

Rini O'Neil, PC
1200 New Hampshire Ave. NW, Suite 600
Washington, DC 20036

202-955-5516
dkaufman@rinioneil.com

MRA MODIFIED VERSION OF LMCC PROPOSAL

25 kHz to Interstitial Interference Contour			Interstitial Channel				
			Modulation				
			12.5 Analog	Any P25 (FDMA, LSM, TDMA)	DMR or NXDN 9.6	NXDN 4.8	2 x NXDN 4.8
25 kHz Channel			< 11K3F3E	8K10F1E/D 8K70D1W 8K90D7W	7K60FXE/D or 7K60FTE/D/W 8K30F1E/D	4K68F1E/D	11K0FTE/D/W
Modulation	Transmitter Emission		25 kHz Derated Interference Contour [dBu r(50,50)]				
25 kHz Analog	16K0F3E or 20K0F3E	Km/r	40	50	45	NR	35
ASTRO Wideband	16K0F1E/D	Km/r	50	60	50	NR	50
OpenSky	12K5F9W	Km/r	40	50	45	NR	35
EDACS	16K0F1E/D	Km/r	35	40	40	NR	35
iDEN or HPD	16K0D7W 12K7D7D	Km/r	20	45	30	NR	15
Possible 12.5 kHz Technologies on 25 kHz centers							
12.5 kHz Analog	11K3F3E	Km/r	65	NR	75	NR	60
P25 FDMA, LSM, TDMA, Simulcast	8K10F1E/D 8K70D1W 8K90D7W 8K90D1E/D	Km/r	65	75	70	NR	65
DMR or NXDN 9.6	7K60FXE/D or 7K60FTE/D/W 8K30F1E/D	Km/r	65	75	75	NR	60
NXDN 4.8	4K68F1E/D	Km/r	NR	NR	NR	NR	NR
2 x NXDN 4.8 (+/- 5.125 kHz)	11K0FTE/D/W	Km/r	70	NR	NR	NR	NR
Possible 90.221 Technologies on 25 kHz centers							
TETRA	22K0D7E/D/W 22K0DXW 25K0D1W 21K6D1E/D/W	Km/r	20	25	20	40	15
2 x P25 FDMA, LSM, TDMA (+/- 4.25 kHz)	21K7D1E/D/W	Km/r	15	20	15	NR	10
2 x DMR (+/- 6.25 kHz)	To Be Determined	Km/r	20	25	20	NR	10
2 x NXDN 9.6 (+/- 6.25 kHz)	To Be Determined	Km/r					
3 x NXDN 4.8 (0, +/- 6.25 kHz)	To Be Determined	Km/r					

NR = derating value > 75 dB, no analysis required

MRA MODIFIED VERSION OF LMCC PROPOSAL

Interstitial to 25 kHz Interference Contour			Interstitial Channel				
			Modulation				
			12.5 Analog	Any P25 (FDMA, LSM, TDMA)	DMR or NXDN 9.6	NXDN 4.8	2 x NXDN 4.8
			Transmitter Emission				
25 kHz Channel			< 11K3F3E	8K10F1E/D 8K70D1W 8K80D7W	7K60FXE/D or 7K60F7E/D/W 8K30P1E/D	4K00F1E/D	11K0F7E/D/W
Modulation	Transmitter Emission		Interstitial Derated Interference Contour [dBu f(50,50)]				
25 kHz Analog	16K0F3E or 20K0F3E	Rcvr	25	20	25	NR	15
ASTRO Widepulse	10K0F1E/D	Rcvr	40	35	40	NR	25
OpenSky	12K5F9W	Rcvr	40	35	40	NR	30
EDACS	16K0F1E/D	Rcvr	70	65	65	NR	NR
IDEN & HPD	16K3D7W 17K7D7D	Rcvr	25	20	25	NR	10
Possible 12.5 kHz Technologies on 25 kHz centers							
12.5 kHz Analog	< 11K3F3E	Rcvr	65	65	65	NR	70
P25 FDMA, LSM, TDMA, Simulcast	8K10F1E/D 8K7D1W 8K80D7W 8K80D1E/D	Rcvr	NR	75	75	NR	NR
DMR or NXDN 9.6	7K60FXE/D or 7K60F7E/D/W 8K30F1E/D	Rcvr	75	70	75	NR	NR
NXDN 4.8	4K00F1E/D	Rcvr	NR	NR	NR	NR	NR
2 x NXDN 4.8 (+/- 3.125 kHz)	11K0F7E/D/W	Rcvr	60	55	60	NR	NR
Possible 90.221 Technologies on 25 kHz centers							
TETRA	22K0D7E/D/W 22K0DXW 22K0G1W 21K0D1E/D/W	Rcvr	25	20	25	60	10
2 x P25 FDMA, LSM, TDMA (+/- 6.25 kHz)	21K7D7E/D/W	Rcvr	25	20	25	NR	10
2 x DMR (+/- 6.25 kHz)	To Be Determined	Rcvr	20	15	20	NR	10
2 x NXDN 9.6 (+/- 6.25 kHz)	To Be Determined	Rcvr					
3 x NXDN 4.8 (0, +/- 6.25 kHz)	To Be Determined	Rcvr					

NR = derating value > 75 dB, no analysis required